

# Making Biodiesel From San Francisco's FOG



## 2011 Stakeholder Summit: Biodiesel Alley

Indianapolis, Indiana

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PUC**

- Overview of the Coalition
  - Originally designated in 1994
  - We serve the City and County of San Francisco
  - 49 square miles with a population of 809,000
  - Housed in the City's Department of the Environment
  - Work closely with the East Bay and Silicone Valley Coalitions
- Overview of Coalition's Efforts in Biodiesel
  - 2006: Mayoral Executive Order requiring the City's 1500+ diesel fleet run on B20
  - 2006: Creation of the S.F. Biodiesel Access Task Force comprised of local activists, industry leaders and representatives of each City agency to streamline retail biodiesel permitting and develop a marine biodiesel fueling strategy
  - "SFGreasecycle" facilitating donations of 300,000 gallons of used cooking oil per year from commercial and residential kitchens
  - "FOG to Biodiesel" demonstration converting restaurant trap waste into biodiesel, biogas and "biobunker" fuels

- Karri Ving, Biofuel Program Manager
  - San Francisco Public Utilities Commission, Wastewater Enterprise Pollution Prevention Program
  - B.A. in Politics from Oberlin College
  - Member of the San Francisco Biodiesel Access Task Force since 2007 and Vice-Chair of its Marine Subcommittee
  - Launched “SFGreasecycle” in 2007, offering free city-wide collection of waste cooking oil to over 1000 participating restaurants.

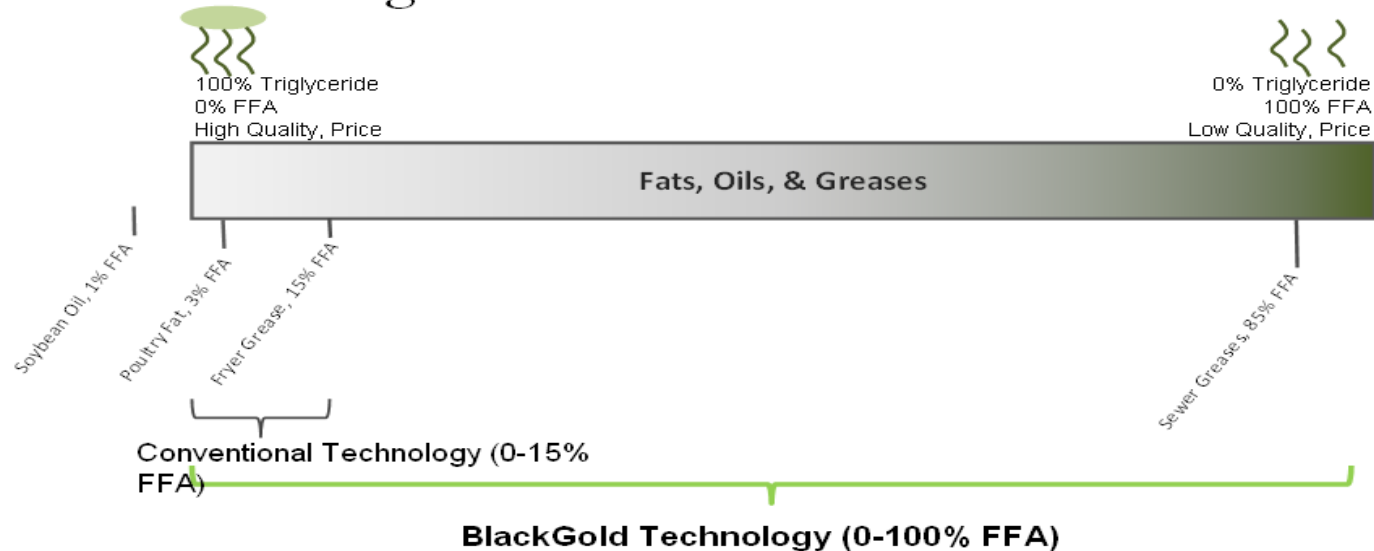
- Purpose: Convert an urban waste stream (restaurant trap waste) with a negative market value into a local energy resource (biodiesel and biogas). DOE grant: \$951,500
- Project Goals:
  1. Demonstrate that co-locating a biodiesel conversion system within a wastewater plant significantly lowers biodiesel production costs while increasing plant biogas generation
  2. Daily conversion of 10,000 gallons of restaurant trap waste into 300 gallons of ASTM biodiesel and “biobunker” fuels. Trap waste impurities fed to digesters for increased methane (biogas) production
  3. Develop and publish a municipal “tool box” for replication including cost/benefit analysis, GHG profile and business case
- Project Update: biodiesel plant running 24/7; demonstration concluded May 31<sup>st</sup> 2011; writing reports and preparing “tool box” for replication
- Key partners: DOE, EPA, California Energy Commission, URS, Black Gold, Pacific Biodiesel
- Importance: Cities could import less fuel while exporting less waste.



# FOG to Brown Grease to Biodiesel



## Commercial Impact of BlackGold's Breakthrough



## Challenges:

1. Production of biodiesel from trap waste at a lower per-gallon cost as compared with diesel and traditional biodiesel.
2. Blending “self-made” biodiesel into existing fueling infrastructure and providing adequate QA/QC.
3. Determining what activities would fall under the public or private sector in a public/private partnership.

# What Will Success Look Like?

## FATS, OIL AND GREASE (FOG) TO BIODIESEL PROJECT

### Goal 1

Demonstrate that co-location of FOG-to-biodiesel facility and Wastewater Treatment Plant (WWTP) provides unique advantages.

### Goal 2

Demonstrate that brown grease can be recovered cost-effectively from waste FOG and concentrated to 99% purity.

### Goal 3

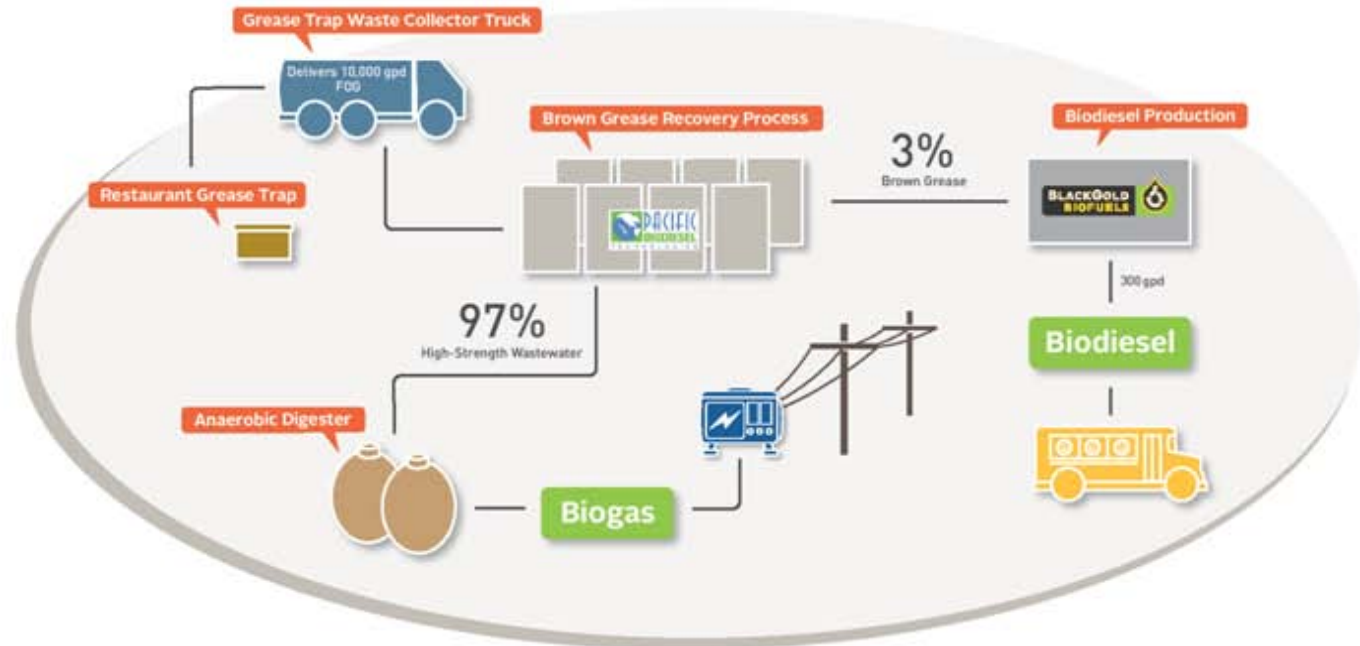
Demonstrate that locally sourced energy can be produced from low quality urban grease.

### Promise of the Project:

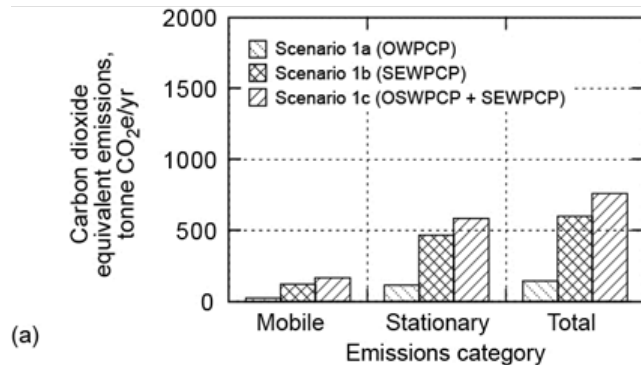
Refined brown grease has been demonstrated to produce 60% more biogas in anaerobic digesters.

Onsite management of wastes from FOG-to-biodiesel project can be provided with no negative impacts to the WWTP's process.

Technologies demonstrated have potential to "close the grease loop", transforming a waste stream into a local energy resource.

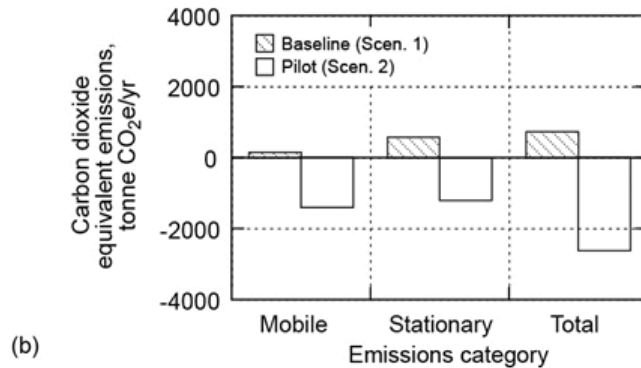






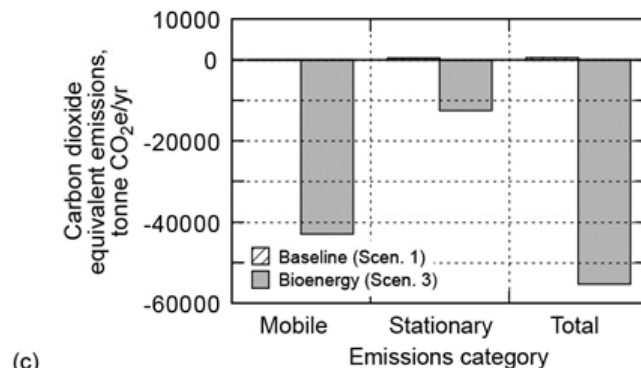
San Francisco's current FOG control program GHG emissions

**Baseline:**  
**760 tonne CO<sub>2</sub>e/yr**



Demonstration project:  
Impact to GHG emissions

**Change from Baseline:**  
**-3,350 tonne CO<sub>2</sub>e/yr**



Commercial FOG-to-biodiesel facility: Impact to GHG emissions

**Change from Baseline:**  
**-56,080 tonne CO<sub>2</sub>e/yr**

**The equivalent of GHG emissions from electricity use by 32,000 San Francisco households.**



# Revenue Opportunity for WWTP

## Example:

Processing 5 million gallon trap waste per year (4 large tanker trucks per day)

At 5% grease content, BG production = 0.25 million gallons/yr  
Biodiesel production = 0.25 million gallons/yr

Revenue from Brown Grease Recovery = \$675,000/yr  
- Tipping Fee 5 ct per gallon = \$250,000/yr  
- Brown Grease market value = 50 ct/lb = \$425,000/yr

Revenue from Biodiesel Production = 1,575,000/yr  
- Tipping Fee 5 ct per gallon = \$250,000/yr  
- Biodiesel Market Value \$5.30/gal = \$1,325,000/yr

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